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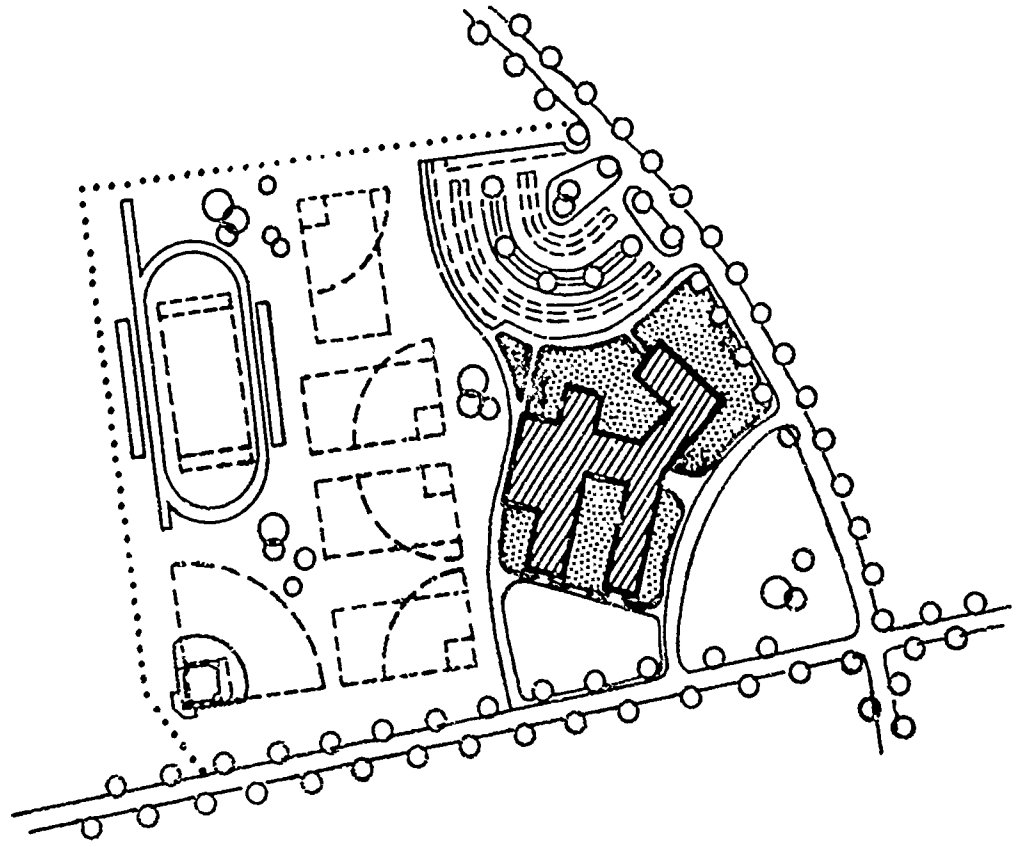
ABSTRACT

A collaborative effort is desirable in the design of school buildings and grounds. In site development of school grounds, effective school board work not only requires a workable plan but good construction details and proper specifications which will result in a first-class job and insure minimum maintenance costs. The most effective way to practice economy in school site development is through proper planning, proper site analysis, and good design, all through the coordinated efforts of professionally qualified consultants and members of the site committee. (GM)

THE SCHOOL SITE

AND

DEVELOPMENT OF SCHOOL GROUNDS



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This pamphlet was written by Dr. Noredo A. Rotunno, landscape architect of Syracuse, working with members of the Division of School Buildings and Grounds. He was assisted by A. Carl Stelling, landscape architect of New York City, in review and criticism.

To them and their colleagues much credit is due for progress in recent years in the field of school site planning.

ARTHUR W. SCHMIDT
Assistant Commissioner, School Finance and Administrative Services

THE SCHOOL SITE AND DEVELOPMENT OF SCHOOL GROUNDS

INTRODUCTION

School facilities especially in suburban communities have undergone drastic changes since 1925. There was a time when many schools were but a single-room building in which several classes were seated together. These schools had very simple and limited facilities in terms of space, light, heat, sanitation and play areas. With the concentration of population, schools became larger and generally multistory in design. More attention was given to space, light, heat and special needs but generally were still located on limited sites within the villages or occupied a corner of a block in our more urban centers. Because of increasing traffic hazards it was necessary to fence them for the safety of the children. The "school grounds" often were a cinder or gravel play area.

As time went on more consideration was given to the site and more facilities were added to the building. The school plant began to assume a greater significance in the social life of the community.

Years ago schools were largely used between 9 a. m. and 3 or 3:30 p. m. five days a week. Today our school buildings are used much more efficiently. Between the normal school functions and extracurricular programs, they are open from morning until late in the evening, winter and summer.

Our school curriculums have undergone considerable changes. More attention is being given to the physical development of the child, and as a result additional space is now required for the planning and development of school grounds.

The former three- and four-story structures have gradually been replaced by one- or two-story buildings and these schools now occupy considerably more ground area. At the same time there has been a demand for more recreational space for school and community use. The results have been that the educational agencies are demanding much greater land areas for our present schools. No doubt this trend will continue. It is also evident that schools are assuming a greater and greater role in the social life of the community. School buildings and grounds have become the "hub" of community activities in many of our towns, villages and cities. The size and importance of the school grounds will become more and more significant.

PRELIMINARY STUDY AND SITE SELECTION

The increasing cost of school construction coupled with an unprecedented population growth has thrown a heavy burden on the taxpayer for educational facilities. One of the most effective ways of cutting school project costs is to analyze carefully all pertinent factors prior to selection of the site. Such study is often undertaken by a professional consultant, or by a special site committee composed of qualified local citizens and members of the school board. The site selection committee might well be composed of the architect, landscape architect, a group from the school board and a representative of the State Education Department as consultant. This committee should investigate the growth trends of the community, the relation of the site to existing and future population, and accessibility by car, bus and to pedestrians as well as physical characteristics of the site itself.

The committee should consider not only the size but topographic characteristics that would make possible a pleasing, efficient and economical development. The elementary site graph of the Division of School Buildings and Grounds of the Education Department is based on three acres plus one acre for each 100 pupils enrolled, with a minimum of five acres. The 7–12 and K–12 graph is based on five acres plus two acres for each 100 pupils up to an enrollment of 500; beyond 500 one acre is added for each 100 pupils, with a minimum size of 10 acres.

A site with a reasonable and interesting topography which can be developed without excessive grading, which is naturally well drained and has some natural vegetation, will result in a more satisfying and economical solution than one which is flat, poorly drained and with no vegetation.

Areas that are " pocketed " may not be so desirable as sites that are high with good air drainage to prevent fog and provide cool fresh air on warm and humid days.

Test holes should be dug on the proposed site to determine the general character of the soil and subsurface conditions in terms of rock, hard pan, water table and drainage. Generally speaking, sandy loam soils are preferred, clay loams might be considered second choice, with heavy clay or very sandy soils as poor. Soils that permit ready percolation of water will make playfields more economical to maintain and permit more extensive use than poorly drained soils. Likewise, plants and grass areas will generally thrive better in soils that have good underdrainage. Soil and subsurface conditions are particularly important from the standpoint of sewage disposal if public sewers are not available.

Where community service water is not available, the committee should investigate the experience with drilled wells in that area to determine insofar as possible the quantities and quality of the water supply before making any commitment on a site.

SITE DEVELOPMENT

After a site has been selected, it is of utmost importance to obtain an accurate boundary line and topographic survey of the property. See attached schedule "B" for outline of survey requirements. Additional soil borings will also be required to determine the character and depth of topsoil and the character of the subsoil, rock conditions, bearing, soil percolation etc., all of which influence the total cost of development. After all this information has been carefully recorded, the site planners can proceed with plans for the development of the total site.

In planning the school site development, efforts should be made to develop a coordinated plan in which every unit functions properly with the adjacent unit and is compatible with it. Too often schools are designed without consideration of all the elements that make a total school program, and the results are dissatisfaction, greater maintenance costs and less efficiency of operation. Many thousands of dollars can be saved through proper relation between buildings, roads, parking areas and play areas, to the terrain and to each other. This can be accomplished by considering the location, size, shape and orientation of the site and its topography as well as soil, drainage and vegetative growth.

The site planner would probably first study relationships between the function of the school inside with compatible functions or relations to outside areas. In this way approaches — vehicular, pedestrian and service — would be laid out. Circulation within the building as well as out-of-doors should be studied and spaces allocated for kindergarten, elementary, intermediate and high school groups and adult programs.

The best location of the building should be determined in its relation to major areas of the site. Careful studies of plan, elevation and sections should be made and checked with the surrounding exterior requirements for proper coordination. In locating the building, the planners should collaborate very closely with the architect on the orientation of its principal elements so that it seems to grow out of the topography, giving the impression of stability and naturalness. The ground should slope slightly away on all sides sufficient to take care of surface drainage. Every effort should be made to avoid steep banks or retaining walls.

From school building to recreational areas, the transition from higher to lower level should be carefully studied and every effort made to avoid harsh mechanical slopes and abrupt breaks in grade. Roads and walks should be graded and aligned to blend with the topography and planned to avoid steep slopes and long flights of steps.

A good site plan would consider the natural features of the site, using as many as possible in the overall scheme so they might be made assets rather than liabilities in the design. A wooded area might be used as an outdoor laboratory for nature projects or a setting for spring and fall classes. If such features can be incorporated into the total design, they will provide a distinction that can be obtained in no other way.

Ample space should be allowed around buildings to permit easy flow of pedestrian and vehicular traffic as well as adequate parking spaces. All access roads and walks should be designed for safety, convenience, economy and easy maintenance. The approaches from a highway or street leading to the school must also be planned with this in mind. The design and construction of drives is one of the most important features of school site development and should be designed for heaviest traffic loads. It is important that approach or service drives do not separate the building from play areas or recreation fields. Under no condition should a drive completely encircle the building.

The approaches to unloading areas should be convenient and safe, with adequate turning radii for all possible vehicles using the approach. All vehicles should be able to pull up to and parallel with the curb of unloading areas without backing for safest loading and unloading operation. Approaches should be designed so that vehicles will unload on the school side of the drive. The unloading of children should never be permitted where they must walk across traffic lanes and children should board buses or vehicles directly from the loading and unloading areas. Furthermore, buses should continue in a forward motion without the necessity of backing up or turning around in the immediate area of the loading platform.

Drives, parking and service areas must be properly designed to carry anticipated traffic of the type of vehicles likely to use the area, their size, weight and probable speed, as well as local weather conditions. The maintenance of these areas can be quite appreciable, but proper design can materially reduce this yearly maintenance cost. In this respect durable granite or concrete curbing is recommended, particularly on steep grades, along curved approach roads and at parking and service areas. Such curbing will control storm water

runoff, prevent breaking the edge of pavement, keep cars from running out over grass areas and help protect children on adjacent walks and play areas.

Parking areas are becoming more important in the planning of school grounds; many high school students drive their own cars while school grounds are used more than ever for a wide variety of community purposes. Careful study should be made and ample space provided for parking areas to accommodate the maximum population that may attend these special functions. This does not necessarily mean that all such areas must be hard surfaced. For large gatherings it may be possible to use certain turf areas for overflow parking if the soil and drainage are adequate.

It is often possible to design paved play areas for alternate use as overflow parking during nonschool hours. In this case care should be taken to prevent cars using these areas while children are at play — a removable chain or gate is considered best. Parking areas must be readily, conveniently and safely approached from the road system and convenient to the building or outdoor areas which they serve.

Care should be taken to avoid inviting loops which might lead to speeding and " race track " driving on the part of students. Design of parking areas should be carefully considered in terms of initial cost, probable use and maintenance as well as the probable schedule of events that would demand their use.

Service areas should be of adequate size, located inconspicuously and designed to cause the least interruption of normal traffic. Study should be given to the type of equipment to use in the area and ample space should be provided for easy maneuvering of such vehicles. Provision must also be made for proper storage of garbage and rubbish containers, keeping service areas not only safe but neat and clean as well.

Walks deserve special attention and study. Their location, width, grade, construction and relationship to roads, entrances and paved areas are important and should result in interesting as well as useful patterns. There is a definite relation between traffic and width. Walks of ample width, easy grade, interesting pattern and reasonable directness will invite children to use them.

In the choice of materials consider cost, maintenance and compatibility with materials used in adjacent buildings as well as conditions of the base upon which they are laid. Concrete walks generally give the best results; however, less expensive asphalt or so-called blacktop walks can be used where traffic is lighter, where conditions require less rigid patterns or where walks occur over filled areas subject to settlement.

Exterior lighting should be integrated with the site development so that principal approaches, parking areas, drives and the school entrances will have adequate illumination for the people attending adult education classes or special evening functions.

All of the above spaces, drives, parking areas and service areas should have proper drainage and disposition of storm water. It must be borne in mind that a road is only as good as its drainage. Good rainage results in long lasting surfaces and a minimum of maintenance.

Play areas, whether they be playfields, turf or hard-surfaced areas, should be carefully designed and constructed. Their number, size, location and use will, to a great extent, determine design. Economies in materials and improper construction may provide temporary advantage, but years of trouble and expense. It is far better to achieve economy through good planning, simple construction and design that provides for maximum use of such areas. The use of paved play areas for overflow parking and the coordination of community-school recreational programs are two examples of this type of economy.

To repeat, all elements of the plan, whether they be adjacent to the buildings such as roads, walks, terraces, parking areas, service areas etc., or whether they be approaches to playfields or playfields themselves, should be designed for convenience, comfort, safety, economy and easy maintenance.

PLANTING

A great deal of attention should be given to planting design. Careful integration of buildings and open spaces with the surrounding property is the aim of the landscape architect. Although the value of attractive and appropriate planting is generally accepted, it is difficult and expensive to obtain competent personnel to maintain grounds and plantings. More and more of our maintenance is being mechanized and, therefore, in the planting design efforts should be made to minimize the need for manual labor and plan areas for maintenance largely through the use of mechanical equipment.

The preservation of existing plantings and introduction of new plantings should be limited to varieties that have few objectionable characteristics.* Shrub plantings should be kept to a minimum and careful thought given to the selection of appropriate kinds.

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* Trees or shrubs with large fruit, coarse leaves and brittle branches should be used with caution, primarily from the standpoint of possible damage by children through throwing as well as the smothering of turf and maintenance problems involved with coarse leaves and brittle branches.

With the great variety of plant material available, we can predetermine the characteristics desired and choose plants that will provide the desired results. This, of course, can best be done by competent and qualified landscape architects who know and understand plant materials, but who do not commercially benefit from their sale.

All plantings should be considered from the standpoint of the maintenance they require as well as their adaptation to soil, exposure, proximity to play areas etc. Existing trees and shrubs should be integrated into the plan if this can be done to advantage. Trees and shrubs may provide interest and usefulness in many diverse ways. They may be used as screens, protection against wind, sound and dust; they provide coolness and shade, interesting shadows as well as variety of foliage, flower, fruit and bark characteristics.

Turf areas must be carefully prepared and properly graded. Deep topsoil of proper quality will materially reduce maintenance costs. All lawn areas should have a minimum of 4" of good topsoil while 5" or 6" is better, particularly where heavy use is anticipated. A good and suitable grass mixture is likewise of utmost importance. The quality of the soil, exposure and weather conditions as well as the intended use of the area are all important factors to consider in the makeup of a grass seed mixture.

It is important to have the highest quality seed available. There is so little difference in the cost between ordinary seed and high grade seed that the best appropriate seed is the most economical in the end.

SUMMARY

In summary, the design of school buildings and grounds is not a one-man job; it should be a collaborative effort. The design of the building alone is not sufficient. The whole development, starting at the entrance to the grounds, should welcome and invite the youngster beginning kindergarten, the elementary school child and the high school adolescent. Entrances, approaches and the building itself should likewise welcome in a direct, safe and inviting way the teachers, the parents, the custodian and the service people.

The plan, in general, should express the several purposes to which the areas are assigned and should lead the visitor, whether on foot or in a car, to his destination with minimum effort. In the site development of school grounds, the school board should not only require a workable plan but insist on good construction details and proper specifications which will result in a first-class job and insure minimum maintenance costs.

The most effective way to practice economy in school site development is through proper planning, proper site analysis and good design, all through the coordinated efforts of professionally qualified consultants and members of the site committee.

SCHEDULE "A"

Site Development Provisions of the Education Law

Section 408, paragraph 3, of the Education Law, reads as follows:

> The commissioner of education shall approve the plans and specifications, heretofore or hereafter submitted pursuant to this section, for the erection of any school building or addition thereto or remodeling thereof on the site or sites selected therefor pursuant to this chapter, if such plans conform to the requirements and provisions of this chapter and the regulations of the commissioner adopted pursuant to this chapter in all other respects: provided, however, that the commissioner of education shall not approve the plans for the erection of any school building or addition thereto unless the site has been selected with reasonable consideration of the following factors: its place in a comprehensive long-term school building program; area required for outdoor educational activities; educational adaptability; environment, accessibility; soil conditions, initial and ultimate cost.

SCHEDULE "B"

General Survey Requirements

1. Metes and bounds description of property line, including all adjacent roads with proposed improvements
   North point and location of monuments, if any
2. Topographic survey (scale 1″ = 40′ or larger)
   a. 100-foot grid
   b. 1-foot contours for average conditions (5-foot contours with heavy lines)
   c. Topography 10 feet beyond property boundary lines
   d. Description of topography, i. e. direction of flow of streams (if any) swamp, woodland, general character and slope of ground, buildings, or other structures
   e. All existing utilities, drainage structures with pipe sizes, inverts and outfall grades on site and adjacent roads
   f. Location of any existing buildings and facilities
   g. Location of all principal trees, generally 6″ or more in caliper
   h. Datum used
   i. Existing grades of all adjacent roads and sidewalks, including type of pavement
   j. Other pertinent physical features